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SURVIVING THE TIDES

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MF-1-469 SCIENTIFIC PHOTOGRAPHY

Surviving the Tides

Aim:

I live near the Ramsar listed Westernport wetlands. I was interested to learn more about them because I enjoy visiting and watching wildlife in their natural habitat. My aim is to photograph glimpses of our mangroves and saltmarshes to demonstrate how they adapted to the harsh tides threatening to destroy them.

Method:

I used a Fujifilm FinePix HS25EXR DSLR camera with 24-720 mm 30x lens. For closeup photos I used aperture mode. This allowed me to choose how much light entered the camera. I used f2.8 and f3 to make the depth of field shallow.

To demonstrate the movement of the tides I used shutter speed mode. This meant I could set a longer exposure time. I needed a tripod to stabilize the camera so that the image was clear. For this photo I went to Jack's beach where the tide comes in rapidly. We arrived just before high tide. I didn't need to use a flash as there was plenty of natural light when I was taking photos.

To take microscope photos I used an Optico GT5 Digital Microscope camera. We made a homemade microtome using a carrot to hold a piece of mangrove leaf so we could cut thin cross sections. I used Diffquick stain to highlight the salt glands. I examined my slide under 100x magnification using a compound microscope.

I used Microsoft photos to crop some images.

Scientific content:

Why are coastal wetlands important?

Coastal wetlands provide habitats for animals including migratory birds, crustaceans, mollusks, microscopic zooplankton, and fish.

Fun fact! In northern Australia saltwater crocodiles rule the mangroves.

Coastal wetlands are part of a family called blue carbon. Scientists have discovered that some salt tolerant plants are able to store carbon in the soil for thousands of years.

It is essential to protect our mangroves and salt marshes because if they become degraded, they can release carbon dioxide and methane into our atmosphere causing more global warming.

Fun fact! Did you know coastal wetlands are 30-to 50 times more efficient than terrestrial forests at storing carbon? (Kyriacou, 2023)

Mangroves can protect us from rising sea levels and storm surges by stabilizing soils on the shoreline. (Kyriacou, 2023)

Threats

There are many threats to our significant coastal wetlands, including pollution from rubbish, pesticides, and oil. Livestock grazing can foul wetland environments by squashing plants and destroying habitats. Housing developments consume land, requiring land clearing threatening mangroves and salt marshes. Other threats include dredging, erosion, storm surges and climate change. (Kyriacou, 2023)

How do they survive?

Mangroves have aerial roots which enable them to breathe when the tide goes out. White Mangroves need aerial roots because there is a lack of oxygen in the waterlogged soil they inhabit. (Harvey 2023, p271) Aerial roots have small openings called lenticels which enable gas exchange with the atmosphere. Some species have prop roots or anchor roots to help them stand up against the strong tidal flow.

Fun fact! Did you know that mangrove forests cover up to 0.1 percent of the world's surface? (Harvey, 2023, p275)

Mangroves need to be salt tolerant to survive. White mangroves dispose of salt by releasing it onto their leaves through salt glands. At the bottom of the salt gland are collecting cells that gather up salt to pump into the secreting cells further up. Secreting cells pump the salt to the surface through pores in the cuticle creating salt crystals on the leaves. Thickened root cells filter salt out of the water at the roots reducing the amount of salt absorbed. (Harvey 2023, p 275)

Salt marshes must survive the flooding tide that is drawn in by the moon. The halophytic plant roots produce their own salts which draw water in so they can inhabit brackish coastal estuaries and marshes. Some saltmarsh species turn red under stress. During the strong tides of winter, they produce a pigment called betacyanin to protect their leaves in low temperatures. (Harvey, 2023, p278, 279)

Fun Fact! The critically endangered orange bellied parrot feeds on coastal saltmarsh plants. (birdlife.org.au, 2024)

How can we look after them?

- Managed retreat: a strategy of adapting to rising sea levels by getting out of salt marshes way so they can move inland.
- Tidal reinstatement: removing levees and dykes near mangroves and salt marshes to let the tide flow naturally.
- Fencing off waterways
- Plant restoration – planting mangroves and seagrass (Kyriacou, 2023)

Word count: 735 words

Appendix one:

Definitions:

Coastal wetlands:

Coastal wetlands are diverse places such as mangrove forests, salt marshes, sea grass meadows, estuaries, and mud flats.

Mangrove:

A mangrove is a small shrub or tree adapted to growing in brackish water and muddy waterlogged soils in the intertidal zone of the coast and in river estuaries.

Also: The name given to the habitat in which these plants grow. (Mayfield 2021, p 173)

Halophyte:

A halophyte is a salt resistant or salt tolerant plant that completes its lifecycle in soils or waters containing high salt concentrations. (Mayfield 2021, p 131)

Saltmarsh:

A saltmarsh is a low growing plant community typically dominated by halophytic vegetation and occupying the intertidal zone of coasts or fringing in land salt Lakes. (Mayfield 2021, p 259)

Intertidal:

The zone of a seashore that is submerged during high tide and exposed during low tide. (Mayfield 2021, p 151)

Bibliography

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Unedited photos